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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,592	10/05/2005	David Anthony Barrow	930058-2004	6831

7590 12/31/2008  
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EXAMINER
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CHAUDRY, ATIF H

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3753

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/534,592	<b>Applicant(s)</b> BARROW ET AL.	
	<b>Examiner</b> ATIF H. CHAUDRY	<b>Art Unit</b> 3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-31 and 33-48 is/are pending in the application.
- 4a) Of the above claim(s) 23-27, 29, 30 and 37-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21, 22, 28, 31, 33-36 and 40-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/08/2008</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### **Status of the claims**

Applicant's amendment as filed on 09/23/2008 has been entered. The amendment cancelled claims 32 and 49 and amended claim 31. Currently claims 21-31 and 33-48 are pending in this application. Claims 23-27, 29-30, 37-39 are withdrawn.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 48 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 48 depends on a cancelled claim 32.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 21, 22, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Burns (PG Pub 20030145894).
3. Regarding claims 21 and 22, Burns (Fig. 5-9) discloses a device comprising first and second inlet passages 9, 10 for respective immiscible fluids, the first and second inlet passages merging into a third passage 11 along which, in use, the two fluids flow under parallel laminar flow conditions (lines 9 & 10 are parallel in Fig. 9), the third

Art Unit: 3753

passage 11 being formed with a discontinuity 1, in use, causing the two fluids to form into a flow of alternate segments.

4. Regarding claim 28, Burns (page 1, para 12) discloses a segmented flow device comprising pathways made of fluoropolymer to avoid sticking.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 40, 41, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579).

4. Burns (Fig. 5-9) discloses a device comprising first and second inlet passages 9, 10 for respective immiscible fluids, the first and second inlet passages merging into a

Art Unit: 3753

third passage 11 along which, in use, the two fluids flow under parallel laminar flow conditions, the third passage 11 being formed with a discontinuity 1, in use, causing the two fluids to form into a flow of alternate segments. Burns (page 1, para 12) teaches a segmented flow device comprising pathways made of fluoropolymer to avoid sticking. Burns fails to disclose two substrates disposed face-to-face. Kopf-Sill et al. (Fig. 4) teaches a segmented flow device comprising of flow channels made by two substrates disposed faced to face and surface of one substrate profiled to define conduits. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns, with two substrates as taught by Kopf-Sill et al. as a convenient method of defining conduits in substrates.

5. Claims 31, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) further in view of Ekstrom et al. (US Patent 5376252).

6. Regarding claims 31, 33, and 34, Burns (Fig. 5-9) discloses a method of producing segmented flow using a device comprising a first conduit 11 provided with a discontinuity 1 where it splits into two parallel inlet passages 9, 10 which provide immiscible fluid to merge at the intersection and cause segmented flow downstream of the discontinuity. Burns fails to disclose two substrates disposed face-to-face. Kopf-Sill et al. (Fig. 4) teaches a segmented flow device comprising of flow channels made by two substrates disposed faced to face and surface of one substrate profiled to define conduits. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns, with two

Art Unit: 3753

substrates as taught by Kopf-Sill et al. as a convenient method of defining conduits in substrates. Burns or Kopf-Sill et al. fail to disclose substrates encased in casement layers. Ekstrom et al. (Fig. 9) teaches two layers of substrates 21, 23 having fluid passages defined in between and encased by casement layers 24, 25. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with encasement layers as taught by Ekstrom et al. in order to provide an outer protection for the substrate layers and keep them together.

7. Regarding claim 35, Burns (page 1, para 12) discloses a segmented flow device comprising pathways made of fluoropolymer to avoid sticking.

8. Claims 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) and Ekstrom et al. (US Patent 5376252) alone or further in view of Takehiko et al. (JP2002277478).

9. Burns fails to discuss different flow rates but the difference in size of slugs in Fig. 8 would result inherently from different flow rates. Takehiko et al. (Fig. 1) teaches a device for producing segmented fluid flow, comprising inlet passages 20A, 20B merging into a third passage 30 causing segmented flow. Takehiko et al. teaches different sized alternate segments in figures 2 and 4, which inherently imply different flow rates of the two fluids. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns with different flow rates in each inlet passage as taught by Takehiko et al. in applications requiring different sized segments.

Art Unit: 3753

10. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) further in view of Kennedy (US Patent 6509085).

11. Burns or Kopf-Sill et al. fail to disclose outer members holding the substrates. Kennedy (Fig. 2C) teaches a microfluidic device with outer clamps 220, 225 holding two substrates 5, 35 together. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with clamping means as taught by Kennedy in order to secure together the two substrates.

12. Claims 43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) and Kennedy (US Patent 6509085) further in view of Ekstrom et al. (US Patent 5376252).

13. Regarding claim 43, Burns or Kopf-Sill et al. fail to disclose substrates encased in casement layers. Ekstrom et al. (Fig. 9) teaches two layers of substrates 21, 23 having fluid passages defined in between and encased by casement layers 24, 25. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with encasement layers as taught by Ekstrom et al. in order to provide an outer protection for the substrate layers and keep them together.

14. Regarding claim 47, Ekstrom et al. (Fig. 9) teaches access openings 26 in the casement layer for fluid access to the passages formed in the substrates.

Art Unit: 3753

15. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) and Kennedy (US Patent 6509085) and Ekstrom et al. (US Patent 5376252) further in view of Mets et al. (US Patent 3537889).

16. Burns fails to disclose substrates disposed in a cavity formed by casement layers. Mets et al. (Fig. 2) teaches substrates 14, 15 disposed in cavities 11, 12 formed between casement layers 10, 13. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with cavities in encasement layers as taught by Mets et al. in order to provide a convenient location for placement of substrates.

17. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579), Kennedy (US Patent 6509085), Ekstrom et al. (US Patent 5376252) further in view of Tomita et al. (US Pg Pub 20020040754).

18. Burns fails to disclose interlocking features. Tomita et al. (Fig. 1, 3) teaches aligning pins 233, 534, 535 for aligning and locking-in-place substrates between base layer and clamps. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with aligning pins as taught by Tomita et al. in order to provide alignment of the substrates and prevent relative movement.



***Allowable Subject Matter***

19. Claim 45 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art fails to disclose substrates disposed within a cavity formed by the casement layers such that the depth of the cavity is less than the combined thickness of the two substrates.

***Response to Arguments***

20. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ATIF H. CHAUDRY whose telephone number is (571)270-3768. The examiner can normally be reached on Mon-Fri Alternate Friday off 9-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Huson can be reached on (571)272-4887. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Atif H Chaudry/  
Examiner, Art Unit 3753

/Stephen M. Hepperle/  
Primary Examiner, Art Unit 3753

12/22/2008